UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/970,929	10/05/2001	Jun Koyama	740756-2368	3139

31780 7590 08/25/2004

ERIC ROBINSON
PMB 955
21010 SOUTHBANK ST.
POTOMAC FALLS, VA 20165

EXAMINER	
NELSON, ALECIA DIANE	

ART UNIT	PAPER NUMBER
2675	12

DATE MAILED: 08/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/725,849
Filing Date: November 30, 2000
Appellant(s): PARK ET AL.

James T. Eller, Jr.
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed June 14, 2004.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences, which, will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1-8, 11-14, 16 and 18 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

6,297,792	Takahashi	10-2001
6,369,469.	Miwa et al.	05-2002
5,907,313	Kubota et al.	05-1999

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 4-5, 8 and 11-14, 16 and 20-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Takahashi (US patent NO. 6,297,792).

As to independent claim 1, Takahashi (figure 6) teaches a liquid crystal display (10) that includes a liquid crystal pixel cells (16) arranged at each intersection between a plurality of lines (Y1-Ym) and a plurality of data lines (X1-Xn) in a matrix type and being driven with thin film transistors (40 in figures 4 and 5) (col.11, lines 28-52). Takahashi teaches applying a first signal to the liquid crystal pixel cells through the data lines for charging thereof during the beginning of a frame (period) and applying a second signal different from the first signal to the liquid crystal pixel cells through the

data lines for discharging thereof during an ending of the frame (period) (abstract, col. 14, lines 45-63, col. 14 line 64 through col. 15, line 4, col. 15, lines 41-63, col. 19, lines 18-39, and figures 8a-8d and 9a-9b).

As to claim 4, as can be seen from figures 8a-8d and 9a-9b; the gate pulse is applied twice during one period (first half of the period and the second half of the period).

As to claim 5, Takahashi (figure 6) teaches a liquid crystal display (10) that includes a liquid crystal pixel cells (16) arranged at each intersection between a plurality of lines (Y1-Ym) and a plurality of data lines (X1-Xn) in a matrix type and being driven with thin film transistors (40 in figures 4 and 5) (col.11, lines 28-52). Takahashi teaches applying a first signal to the liquid crystal pixel cells for charging thereof during the beginning of a frame (period) and applying a second signal to the liquid crystal pixel cells for discharging thereof during an ending of the frame (period) (abstract, col. 14, lines 45-63, col. 15, lines 41-63, col. 19, lines 18-39, and figures 8a-8d and 9a-9b). Figures 8a-8d and 9a-9b); the gate pulse is applied twice during one period (first half of the period and the second half of the period) (col. 14, lines 9-17).

As to claim 8, Takahashi teaches generating gate pulse (scanning pulse) at a start of the frame and a midpoint of the frame (col. 14, lines 41-63).

As to claim 11, Takahashi teaches a liquid crystal display that includes applying a first signal to the liquid crystal pixel cells for charging thereof during the beginning of a frame (period) and applying a second signal to the liquid crystal pixel cells for completely discharging thereof during an ending of the frame (period) (abstract, col. 14,

lines 45-63, col. 15, lines 32-37 and 41-63, col. 19, lines 18-39, and figures 8a-8d and 9a-9b) and figures 8a-8d and 9a-9b.

As to claim 12, as best understood by the examiner, Takahashi teaches a discharging period takes most time in one period (see figures 9A-9B).

As to claim 13, figures 8a-8d substantially read on the claims by having a pulse of one polarity in the beginning of the period and then substantially no charges are applied in the middle, and a pulse of opposite polarity at the end (col. 14, lines 41-63).

As to claim 14, as can be seen from figures 8a-8d and 9a-9b; the gate pulse is applied twice during one period (first half of the period and the second half of the period) (abstract). Takahashi also teaches applying no charge to the pixel element during an ending of the frame, and applying an opposite charge compared with a beginning of previous frame to the pixel element during a beginning of the next frame (figures 8A-8D and col. 14, lines 35-63).

As to claim 16, as discussed above, since the starting of the discharge is at the second half of the period; then the gate pulse is applied at the mid-point.

As to claim 20, as can be seen above, Takahashi shows that the first and second signals are applied through the data lines and are different from each other (one negative and the other positive).

As to claim 21, as can be seen above, the first signal and the second signal are different from each other.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-3 and 6-7 rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi in view of Miwa et al. (US patent NO. 6,369,469; hereinafter referred to as Miwa).

As to claims 2 and 6, Takahashi teaches all the limitations of claims 2 and 6 except the citation that the liquid crystal layer formed of any one of ferro-electric liquid crystal and an anti-ferro-electric liquid crystal.

However, Miwa teaches a liquid crystal display system that includes applying in one frame period, first and second signal (figure 3, abstract and col. 4, lines 4-18), and wherein a ferro-electric display can be used (col. 5, lines 47-52).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use Miwa's teaching having a ferro-electric display to be used in Takahashi's device because as it is known in the art, ferro-electric display has a good memory characteristics, and uses less power.

As to claims 3 and 7, Takahashi teaches all the limitations of claims 3 and 7 except the citation that the liquid crystal display includes a liquid crystal layer formed of twisted nematic liquid crystal having a response speed of less than 10ms.

However, Miwa teaches a twisted-nematic liquid crystal display which has a response time of less than 10ms (in Miwa's device, the response time is between 2-5ms) (col. 52-65).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the teaching of Miwa having a response time of less than 10ms to be included in Takahashi's device so as to have a high response time and to have a liquid crystal display with a characteristics similar to those of CRT (see Miwa, col. 5, lines 60-65).

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi in view Kubota et al. (US patent NO. 5,907,313; hereinafter referred to as Kubota).

As can be seen above with respect to claim 13, Takahashi teaches all the limitations of claims 18 except the citation that the gate driver includes a plurality of gate driver circuits connected together in series.

However, Kubota (figure 9) teaches a liquid crystal display device that includes a plurality of gate drivers connected in series (col. 4, lines 23-37).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the teaching of Kubota having a plurality of gate drivers connected in series to be incorporated to Takahashi so as to increase the speed of the display.

(11) Response to Argument

Appellant (middle of page 5 to page 7) that the Takahashi reference fails to suggest all of the features of the claimed invention (in claims 1 and 4) because while claim 1 recites "applying a first signal through the data lines for charging during the beginning of a frame and applying a second signal different from the first signal through the data lines for discharging during an ending of the frame", Takahashi fails to teach that the first signal is applied during the beginning of the frame, and the second signal applied during the ending of the frame. Examiner respectfully disagrees.

Examiner refuses to admit that applying a second signal during the ending of the frame necessarily means that such signal has to be applied during the second half of the frame. The second signal can be applied exactly at the end of the frame and still considered to be applied during the ending of the frame. Therefore, even if for the sake of argument the examiner agrees with the appellant's argument that Takahashi discloses applying second data signal in the first horizontal period of the next frame (as admitted by appellant in middle of page 6), examiner still believes that Takahashi discloses the claimed limitation simply because the next frame is located immediately at the end of the preceding frame. On the other hand, Takahashi specifically recites "According to the present invention, as described above, overcharging can be adequately performed even if the first half ½ H of one horizontal period H is set as overcharging period Tdc while the second half ½ H is set as discharging period Td." (Col. 14, lines 25-30, col. 15, lines 1-4 and col. 15, lines 41-46). This is means that each period (i.e., frame) is divided into overcharging (i.e., charging) period in time Tdc in the first half and discharging in the second half of the same period in time Td. Comparing

that to figures 8A-8D of Takahashi; we can see that during the first half of the period, a pulse for charging is applied, and during the discharge period in the second half, a pulse for discharging is applied.

With respect to Appellant's argument related to claims 5 and 8 (page 7), appellant agued that in addition to the data driver which charges and discharges during the beginning and ending of the frame, the claim recites the gate driver which applies two gate pulses and sequentially applies the first and second signals, which are not taught by Takahashi. Examiner respectfully disagrees.

With respect to the limitation of having a data driver that charges and discharges during the beginning and the ending of the frame, this limitation is thoroughly discussed above with respect to claim 1. Examiner believes that Takahashi discloses two gate pulses, which apply these signals. The gate driver in the art of active matrix liquid crystal displays such as the one taught by Takahashi can be referred to as the scanning driver (element 100 shown in figure 6). As discussed in the rejection of claim 5 above, figures 8B for example shows scanning signals. As can be clearly seen, at least two scanning signals (i.e., gate pulses) (col. 14, lines 9-17).

Appellant (first paragraph of page 8) argued that Takahashi reference does not show charging during the beginning and completely discharging before the end of the frame. Examiner respectfully disagrees. Takahashi states, "the voltage applied to the MIM element 20 and the liquid crystal layer 18 in discharging period Tdj becomes VS2+VH/2, thereby achieving adequate discharging. As result, the MIM element 20 is set in the off state, and inadequacy of overcharging is not a problem." (Col. 15, lines 32-

37). This simply means that the discharging voltage will turn of the MIM (metal insulator metal), which is connected to the liquid crystal layer 18. In turn the liquid crystal layer will be completely discharged. Appellant also argued that claim 12 further recites the length of the relative periods of the charging and discharging is not shown in Takahashi. Examiner respectfully submits that as best understood, the claim is simply directed to have the charging period is shorting than the discharging. For that, in the rejection above, the examiner referred to figure 9B, which clearly shows that the charging period is shorter than the discharging period.

Appellant (lat paragraph of page 8) argued that Takahashi does not show the use of no charge during an ending of the frame and does no show this combination of three-steps. Examiner respectfully disagrees. The examiner shows for example figure 8B wherein two opposite voltages are applied at the beginning of each frame. The ending of the frame shows only the voltage VH/2, which is the voltage, corresponds to the data and not for charging or discharging.

Appellant (first paragraph of page 9) argued with respect to claims 14 and 16, that Takahashi does not include the application of no charge during an ending of the frame along with the other steps of applying either a positive or negative charge, the activation of the transistor placed during a frame and having two pulses within one frame. Examiner respectfully submits that Takahashi teaches such limitations as discussed in the rejection above, and as discussed in the response to the argument of claims 5 and 13. Such response also applies to claims 14 and 16.

Appellant (first paragraph of page 10) argued with respect to claims 2 and 3 that it would not be obvious to one of ordinary skill in the art to add the teaching of Miwa to Takahashi in order to show the teachings of dependent claims 2 and 3 as they depend from claim 1. Examiner respectfully submits that Miwa's reference was cited to show that the liquid crystal device of Takahashi could be of ferroelectric or anti-ferroelectric type. The motivation of combining the two references is clearly stated in the rejection above. Similarly with respect to claims 6-7 which are substantially similar to claims 2-3.

Appellant (last paragraph of page 10) argued with respect to claim 18 that there is no motivation shown for one skilled in the art to include the gate driver of Kubota et al. into the device of Takahashi. Examiner respectfully submits that such motivation is clearly stated in the rejection above, and that is to increase the speed of the display because as it is known in the art of display, having a plurality of drivers instead of one drivers would increase the speed of the display in the trade of increasing the price of the device. As to the argument that the claim discloses having at least two gate pulses within one frame interval, this argument has been answered in the response to claim 5 above.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Amr A. Awad.

A.A.
August 23, 2004

Conferees
Richard A Hjerpe

Bipin H Shalwala

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/725,849
Filing Date: November 30, 2000
Appellant(s): PARK ET AL.

James T. Eller, Jr.
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed June 14, 2004.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences, which, will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1-8, 11-14, 16 and 18 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

6,297,792	Takahashi	10-2001
6,369,469.	Miwa et al.	05-2002
5,907,313	Kubota et al.	05-1999

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 4-5, 8 and 11-14, 16 and 20-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Takahashi (US patent NO. 6,297,792).

As to independent claim 1, Takahashi (figure 6) teaches a liquid crystal display (10) that includes a liquid crystal pixel cells (16) arranged at each intersection between a plurality of lines (Y1-Ym) and a plurality of data lines (X1-Xn) in a matrix type and being driven with thin film transistors (40 in figures 4 and 5) (col.11, lines 28-52). Takahashi teaches applying a first signal to the liquid crystal pixel cells through the data lines for charging thereof during the beginning of a frame (period) and applying a second signal different from the first signal to the liquid crystal pixel cells through the

data lines for discharging thereof during an ending of the frame (period) (abstract, col. 14, lines 45-63, col. 14 line 64 through col. 15, line 4, col. 15, lines 41-63, col. 19, lines 18-39, and figures 8a-8d and 9a-9b).

As to claim 4, as can be seen from figures 8a-8d and 9a-9b; the gate pulse is applied twice during one period (first half of the period and the second half of the period).

As to claim 5, Takahashi (figure 6) teaches a liquid crystal display (10) that includes a liquid crystal pixel cells (16) arranged at each intersection between a plurality of lines (Y1-Ym) and a plurality of data lines (X1-Xn) in a matrix type and being driven with thin film transistors (40 in figures 4 and 5) (col.11, lines 28-52). Takahashi teaches applying a first signal to the liquid crystal pixel cells for charging thereof during the beginning of a frame (period) and applying a second signal to the liquid crystal pixel cells for discharging thereof during an ending of the frame (period) (abstract, col. 14, lines 45-63, col. 15, lines 41-63, col. 19, lines 18-39, and figures 8a-8d and 9a-9b). Figures 8a-8d and 9a-9b); the gate pulse is applied twice during one period (first half of the period and the second half of the period) (col. 14, lines 9-17).

As to claim 8, Takahashi teaches generating gate pulse (scanning pulse) at a start of the frame and a midpoint of the frame (col. 14, lines 41-63).

As to claim 11, Takahashi teaches a liquid crystal display that includes applying a first signal to the liquid crystal pixel cells for charging thereof during the beginning of a frame (period) and applying a second signal to the liquid crystal pixel cells for completely discharging thereof during an ending of the frame (period) (abstract, col. 14,

lines 45-63, col. 15, lines 32-37 and 41-63, col. 19, lines 18-39, and figures 8a-8d and 9a-9b) and figures 8a-8d and 9a-9b.

As to claim 12, as best understood by the examiner, Takahashi teaches a discharging period takes most time in one period (see figures 9A-9B).

As to claim 13, figures 8a-8d substantially read on the claims by having a pulse of one polarity in the beginning of the period and then substantially no charges are applied in the middle, and a pulse of opposite polarity at the end (col. 14, lines 41-63).

As to claim 14, as can be seen from figures 8a-8d and 9a-9b; the gate pulse is applied twice during one period (first half of the period and the second half of the period) (abstract). Takahashi also teaches applying no charge to the pixel element during an ending of the frame, and applying an opposite charge compared with a beginning of previous frame to the pixel element during a beginning of the next frame (figures 8A-8D and col. 14, lines 35-63).

As to claim 16, as discussed above, since the starting of the discharge is at the second half of the period; then the gate pulse is applied at the mid-point.

As to claim 20, as can be seen above, Takahashi shows that the first and second signals are applied through the data lines and are different from each other (one negative and the other positive).

As to claim 21, as can be seen above, the first signal and the second signal are different from each other.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-3 and 6-7 rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi in view of Miwa et al. (US patent NO. 6,369,469; hereinafter referred to as Miwa).

As to claims 2 and 6, Takahashi teaches all the limitations of claims 2 and 6 except the citation that the liquid crystal layer formed of any one of ferro-electric liquid crystal and an anti-ferro-electric liquid crystal.

However, Miwa teaches a liquid crystal display system that includes applying in one frame period, first and second signal (figure 3, abstract and col. 4, lines 4-18), and wherein a ferro-electric display can be used (col. 5, lines 47-52).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use Miwa's teaching having a ferro-electric display to be used in Takahashi's device because as it is known in the art, ferro-electric display has a good memory characteristics, and uses less power.

As to claims 3 and 7, Takahashi teaches all the limitations of claims 3 and 7 except the citation that the liquid crystal display includes a liquid crystal layer formed of twisted nematic liquid crystal having a response speed of less than 10ms.

However, Miwa teaches a twisted-nematic liquid crystal display which has a response time of less than 10ms (in Miwa's device, the response time is between 2-5ms) (col. 52-65).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the teaching of Miwa having a response time of less than 10ms to be included in Takahashi's device so as to have a high response time and to have a liquid crystal display with a characteristics similar to those of CRT (see Miwa, col. 5, lines 60-65).

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi in view Kubota et al. (US patent NO. 5,907,313; hereinafter referred to as Kubota).

As can be seen above with respect to claim 13, Takahashi teaches all the limitations of claims 18 except the citation that the gate driver includes a plurality of gate driver circuits connected together in series.

However, Kubota (figure 9) teaches a liquid crystal display device that includes a plurality of gate drivers connected in series (col. 4, lines 23-37).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the teaching of Kubota having a plurality of gate drivers connected in series to be incorporated to Takahashi so as to increase the speed of the display.

(11) Response to Argument

Appellant (middle of page 5 to page 7) that the Takahashi reference fails to suggest all of the features of the claimed invention (in claims 1 and 4) because while claim 1 recites "applying a first signal through the data lines for charging during the beginning of a frame and applying a second signal different from the first signal through the data lines for discharging during an ending of the frame", Takahashi fails to teach that the first signal is applied during the beginning of the frame, and the second signal applied during the ending of the frame. Examiner respectfully disagrees.

Examiner refuses to admit that applying a second signal during the ending of the frame necessarily means that such signal has to be applied during the second half of the frame. The second signal can be applied exactly at the end of the frame and still considered to be applied during the ending of the frame. Therefore, even if for the sake of argument the examiner agrees with the appellant's argument that Takahashi discloses applying second data signal in the first horizontal period of the next frame (as admitted by appellant in middle of page 6), examiner still believes that Takahashi discloses the claimed limitation simply because the next frame is located immediately at the end of the preceding frame. On the other hand, Takahashi specifically recites "According to the present invention, as described above, overcharging can be adequately performed even if the first half ½ H of one horizontal period H is set as overcharging period Tdc while the second half ½ H is set as discharging period Td." (Col. 14, lines 25-30, col. 15, lines 1-4 and col. 15, lines 41-46). This is means that each period (i.e., frame) is divided into overcharging (i.e., charging) period in time Tdc in the first half and discharging in the second half of the same period in time Td. Comparing

that to figures 8A-8D of Takahashi; we can see that during the first half of the period, a pulse for charging is applied, and during the discharge period in the second half, a pulse for discharging is applied.

With respect to Appellant's argument related to claims 5 and 8 (page 7), appellant agued that in addition to the data driver which charges and discharges during the beginning and ending of the frame, the claim recites the gate driver which applies two gate pulses and sequentially applies the first and second signals, which are not taught by Takahashi. Examiner respectfully disagrees.

With respect to the limitation of having a data driver that charges and discharges during the beginning and the ending of the frame, this limitation is thoroughly discussed above with respect to claim 1. Examiner believes that Takahashi discloses two gate pulses, which apply these signals. The gate driver in the art of active matrix liquid crystal displays such as the one taught by Takahashi can be referred to as the scanning driver (element 100 shown in figure 6). As discussed in the rejection of claim 5 above, figures 8B for example shows scanning signals. As can be clearly seen, at least two scanning signals (i.e., gate pulses) (col. 14, lines 9-17).

Appellant (first paragraph of page 8) argued that Takahashi reference does not show charging during the beginning and completely discharging before the end of the frame. Examiner respectfully disagrees. Takahashi states, "the voltage applied to the MIM element 20 and the liquid crystal layer 18 in discharging period Tdj becomes VS2+VH/2, thereby achieving adequate discharging. As result, the MIM element 20 is set in the off state, and inadequacy of overcharging is not a problem." (Col. 15, lines 32-

37). This simply means that the discharging voltage will turn of the MIM (metal insulator metal), which is connected to the liquid crystal layer 18. In turn the liquid crystal layer will be completely discharged. Appellant also argued that claim 12 further recites the length of the relative periods of the charging and discharging is not shown in Takahashi. Examiner respectfully submits that as best understood, the claim is simply directed to have the charging period is shorting than the discharging. For that, in the rejection above, the examiner referred to figure 9B, which clearly shows that the charging period is shorter than the discharging period.

Appellant (lat paragraph of page 8) argued that Takahashi does not show the use of no charge during an ending of the frame and does no show this combination of three-steps. Examiner respectfully disagrees. The examiner shows for example figure 8B wherein two opposite voltages are applied at the beginning of each frame. The ending of the frame shows only the voltage VH/2, which is the voltage, corresponds to the data and not for charging or discharging.

Appellant (first paragraph of page 9) argued with respect to claims 14 and 16, that Takahashi does not include the application of no charge during an ending of the frame along with the other steps of applying either a positive or negative charge, the activation of the transistor placed during a frame and having two pulses within one frame. Examiner respectfully submits that Takahashi teaches such limitations as discussed in the rejection above, and as discussed in the response to the argument of claims 5 and 13. Such response also applies to claims 14 and 16.

Appellant (first paragraph of page 10) argued with respect to claims 2 and 3 that it would not be obvious to one of ordinary skill in the art to add the teaching of Miwa to Takahashi in order to show the teachings of dependent claims 2 and 3 as they depend from claim 1. Examiner respectfully submits that Miwa's reference was cited to show that the liquid crystal device of Takahashi could be of ferroelectric or anti-ferroelectric type. The motivation of combining the two references is clearly stated in the rejection above. Similarly with respect to claims 6-7 which are substantially similar to claims 2-3.

Appellant (last paragraph of page 10) argued with respect to claim 18 that there is no motivation shown for one skilled in the art to include the gate driver of Kubota et al. into the device of Takahashi. Examiner respectfully submits that such motivation is clearly stated in the rejection above, and that is to increase the speed of the display because as it is known in the art of display, having a plurality of drivers instead of one drivers would increase the speed of the display in the trade of increasing the price of the device. As to the argument that the claim discloses having at least two gate pulses within one frame interval, this argument has been answered in the response to claim 5 above.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Amr A. Awad.

A.A.
August 23, 2004

Conferees
Richard A Hjerpe

Bipin H Shalwala

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747